DOCUMENT RESUME

ED 173 924 EA 011 930

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TITLE Energy Conservation in Our Schools--A Practical Approach.
PUB DATE 16 Feb 79
NOTE 10p.; Paper presented at the Annual Meeting of the American Association of School Administrators (New Orleans, Louisiana, February 14-17, 1979); Not available in paper copy due to light print of original document

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS *Custodian Training; Elementary Secondary Education; *Energy Conservation; *School Buildings; *School Maintenance

ABSTRACT

A practical approach designed to reduce energy waste by schools is to improve the knowledge and upgrade the skills of school building custodians. This paper discusses an operation and maintenance training program for custodians developed by the Will County (Illinois) educational service region. The major parts of the program consist of skill building in the following systems: architectural; electrical; heating, ventilating, and air conditioning; water and sanitation; and food service. Besides recordkeeping, a strong emphasis of the program is on regular and preventative maintenance. Instruction is provided via on-the-job training with some independent study required. (Author/LD)

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Research Reports
Fri, Feb. 16, 1979

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February 1, 1979

ENERGY CONSERVATION IN OUR SCHOOLS - A PRACTICAL APPROACH

by

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The ever increasing problem of diminishing fuel supplies and skyrocketing energy costs is economically critical to our schools. Many schools are large consumers of energy and, like many other public and private buildings, they waste a great deal of energy.

The principal causes of this waste are: defective and deteriorating structures, inefficient electrical and mechanical systems, excessive day and night use, and inadequate operation and maintenance.

A practical approach designed to reduce this energy waste is to improve the knowledge and upgrade the skills of the school building custodians.

In reviewing literature, the Will County Educational Service Region's (ESR) staff and consultants were unable to discover a practical program or textbook that would sufficiently increase the knowledge and skills of the custodians concerning energy conservation measures.

In fact, most of the materials that are currently available are fragmented and they are written in highly technical language. This opinion was reinforced by the architects, engineers, and superintendents of buildings and grounds who participated in Will County ESR's workshops, seminars, and conference dealing with energy conservation.

Because of these facts, the U.S. Department of Energy and the U.S. Department of Labor funded proposals submitted by the Will County ESR to develop a comprehensive, but simple, Operation and Maintenance Training Program for school building custodians.

The goal of the O & M Training Program is to upgrade the knowledge and skills of school building operators concerning the architectural, mechanical, and electrical systems of their school building. Because they're directly responsible for maintaining their school building, custodians can help reduce energy waste.

A strong emphasis in the O & M Training Program is placed on a regular maintenance schedule. This includes both day-to-day maintenance, which is part of the daily operating routine of building custodians, and a regular preventative maintenance procedure.

Preventative Maintenance, or P.M., is the key to the Program. P.M. is the procedure of inspecting, testing, preserving, and repairing features and systems of a building at regular intervals. Its purpose is to prevent failures and retard deterioration. During the Training Program, building custodians will develop an understanding of P.M. and a comprehensive knowledge of certain areas to which it can be applied. Using their knowledge of P.M., they will be able to increase the energy efficiency of their school building.

A major part of P.M. is record keeping. Why is this important? Because future problems can be anticipated through careful record keeping. Day to day monitoring of the systems in their building will alert building operators to problems before they get out of hand. Checklists and logs of previous repairs can be referred to for possible causes of these problems.

When done on a regular basis, inspections will help identify problems as they occur, catch them while they're small, and possibly prevent future problems from occurring.

There are different types of inspections which custodians should make. Quick, general inspections which help them survey the overall operating conditions of their particular operating systems. Detailed inspections which require more time and effort and which will enable them to uncover problems not detected during the quick,general inspections.

Periodic maintenance done at regular intervals is another inportant method of preventing problems. The regular upkeep and care of a school building can prevent or eliminate many problems. However, when problems do arise, building operators should know what to do. The Training Program provides a basis for helping them to decide which repairs they can make and which repairs will require the services of a contractor.

How will the O & M Training be provided? Mainly through on-the-job instruction. Custodians will become familiar with the various energy use systems within their school and the architectural features of their buildings. The Trainer will come to their school to show them how preventative maintenance can be applied to their building and its equipment.

Will they have to do some reading on their own? Yes, some independent study will be required. During their on-the-job training,recommended reading materials will

supplement the Trainer's instruction.

In addition to on-the-job training and independent study, custodians will receive some shop instruction. During two shop sessions, demonstrations will be given by the Trainer dealing with problems that were covered during their lessons in their buildings. They'll learn how to replace and repair various parts of their building's mechanical and electrical systems. They'll learn operational tasks, such as changing bearings on motors and how to lubricate various types of equipment. Also, they'll learn how to assemble, disassemble, and install electrical and mechanical devices, including light fixtures, switches, and valves.

The O & M Training Program is presented in six parts or divisions. These parts are divided into units which contain one or more lessons. At the beginning of every lesson, the objectives of the lesson are stated. Following the objectives, a list of instructional materials is provided. This list includes an outline of the content of the lesson, in addition to a list of references, tools, instruments, and other equipment used during the lesson. A glossary is also included for the definition of key terms.

The building operators O & M training begins with an AV presentation. The first division contains an Overview Unit,

which includes a slide tape presentation,as well as a lesson explaining how they can develop a P.M. Program or how they can improve their existing P.M. Program. Following the Overview are units on Basic Tools and Equipment and Basic and Special Test Instruments. These units familiarize the custodian with the tools, equipment, and instruments they will use during their training.

The second Division of the O & M Training Program discusses the Architectural Features of their building, how to spot problems, and how to correct them. The Architectural Division includes units concerning the outside, inside, basement, and foundation of their building. These units discuss repairs they can make when doors and windows are broken, and when caulking and sealing are needed.

The Electrical Systems Division contains units on Sources- how Electricity enters the building; Distribution - where it goes after it enters the building; and Loads - how it is finally used. One of the things they'll learn about is their building's lighting system: the different types of lamps, fixtures, and controls, and the appropriate way to clean, replace, and repair them. In addition, building operators will attend a shop session concerning major and minor repairs of electrical systems.

Next, the HVAC or Heating, Ventilating and Air Conditioning Systems Division contains lessons covering the mechanical systems of their building. They learn how to set and control temperatures; how to use an air flow meter to detect and clean dirty filters, and how to keep their boiler or furnace operating efficiently. They become familiar with the various systems and learn how to keep them in top operating condition. At the end of the HVAC Systems Division, the custodians will attend a shop session. During this session, the Trainer will show them how to handle minor repairs common to their HVAC systems.

The Water and Sanitation Systems Division includes lessons on the hot and cold water systems and the type of sanitation system that they have in their school buildings. The custodians becomes familiar with different types of valves, faucets, and pipes. They learn their parts, how they function, and how to repair them.

The final Division, Food Service Equipment, covers the types of equipment used in their school's kitchen. They become familiar with electric and gas burners, and learn how to repair or replace faulty parts. Also, they learn when it's time to replace defective equipment.

In order to check their understanding of the lessons, the Trainer evaluates their progress from time to time. With

these periodic checks, the custodians will be able to realize their accomplishments throughout the training period.

Upon successful completion of the O & M Training Program, they receive special recognition with a Certificate of Completion. This is an award signed by the Trainer, School District Superintendent, and other appropriate educational officials.

The goal of the O & M Training Program is to improve the building operators' knowledge and skills. They are the most important part of the training process. Their increased knowledge of preventative maintenance will save their school energy and money. As a result of their O & M training, they will be a more valuable member of their school's professional team.